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Finite element modeling of eigenvibrations of a loaded bar

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Abstract

© 2018 Trans Tech Publications, Switzerland. The nonlinear second-order differential eigenvalue problem describing eigenvibrations of a bar with elastically attached load is investigated. This problem has an increasing sequence of positive simple eigenvalues with limit point at infinity. The sequence of eigenvalues corresponds to a system of normalized eigenfunctions. The initial nonlinear eigenvalue problem is approximated by the quadrature finite element method on a uniform grid. The existence and accuracy of approximate solutions are studied. Investigations of the present paper can be generalized for the cases of more complicated and important problems on eigenvibrations of beams, plates and shells with elastically attached loads.

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Keywords

Bar, Eigenfunction, Eigenvalue, Eigenvalue Problem, Eigenvibrations, Finite Element Method, Load, Quadrature Formula, Spring

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